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TRANSMITTAL

TO: Kristin Higgins Vermont Agency of Transportation	DATE	PROJECT NO.
	3/28/2013	Jamaica ER-BRF 015-1 (23)

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WE ENCLOSE THE FOLLOWING:

UNDER SEPARATE COVER WE ARE SENDING THE FOLLOWING

COPIES	NUMBER	DESCRIPTION	CODE
1		Camber Correction Procedure	H
1		Straightness Procedure	H
1		Heat Correction Procedure	H
1		Lot Testing Procedure	H
1		Gouge Procedure	H
1		Slab RT Procedure	H
1		Sweep Correction Procedure	H

CODE:

A FOR INITIAL APPROVAL

B FOR FINAL APPROVAL

C APPROVED AS NOTED-RESUBMISSION REQUIRED

D APPROVED AS NOTED-RESUBMISSION NOT REQUIRED

E DISAPPROVED-RESUBMIT

F QUOTATION REQUESTED

G APPROVED

H FOR APPROVAL

I AS REQUESTED OR REQUIRED

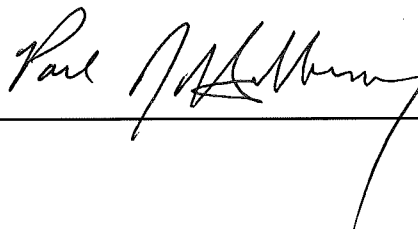
J FOR USE IN ERECTION

K LETTER FOLLOWS

L FOR FIELD CHECK

M FOR YOUR USE

BY:



Title: Heat camber correction procedure for welded girders with 50 ksi or 70 ksi yield strength steel. Procedure for the initial cambering of rolled beams.

Revision: 0

Notify the QA representative prior to using this procedure.

1. Support the girder / rolled beam, with web in vertical position, at girder ends and at intermediate points as necessary to produce the required camber per the approved shop drawings, within the limitations of the specifications.
2. Intermediate safety catch blocks shall be maintained at mid distance between supports of the member and not more than 2" below the flanges at all times.
3. The beam being cambered shall be supported or braced to prevent deflection laterally and overturning during the heating process.
4. Heating shall be performed using a properly sized rosebud style heating tip. Heating shall be confined to areas described in Step 5 or Step 6 and shall be performed so as to bring the steel in these areas to a temperature not exceeding 1,100F as rapidly as possible without overheating the steel.
5. Two methods may be used for heat cambering, or camber corrections using heat. The V-heat method using truncated triangles or the line strip heat method.
6. V-heat method:
 - a. Heating patterns shall be marked on the girders prior to heating. Heat patterns will be located at even distances in a quantity sufficient to produce the desired camber. Patterns shall be truncated triangles with the base of the triangle being at the flange, the base shall not exceed 10 inches. The apex of the triangle shall be located in the web at a point not less than 75% of the depth of the beam from the base of the triangle. The total included angle of the triangle shall not exceed 20 degrees. The Production supervisor and/or leadman is to determine the locations of the V-heats, and shall be approved by QC prior to heating.
 - b.
 - c. Heating shall begin at the apex of the triangle and not proceed toward the base until the truncated area is brought up to a temperature not exceeding 1,100F. Once heating begins to progress towards the base of the triangle it shall not return to the apex. The torch operator shall have 1,000 F, 1,100 F, and 1,150 F temperature indicating crayons. The steel surface temperature shall be monitored frequently during the heating process.
7. Line Strip heat method:
 - a. Heating patterns shall be marked on the steel prior to heating. Line heats shall be marked along the centerline of web, on the surface of the flange which is to be heated. The beam and/or girder will move in the opposite direction of the flange being heated. The line heat lengths and locations shall be determined by the amount of initial camber that is needed, or the amount of camber correction needed, and in which location the correction occurs. The Production supervisor and/or leadman is to determine the locations of the strip heats, and shall be approved by QC prior to heating.

Title: Heat camber correction procedure for welded girders with 50 ksi or 70 ksi yield strength steel. Procedure for the initial cambering of rolled beams.

Contract: Moses Wheeler, Connecticut DOT **Revision:** 0

- b. Heating shall begin at one end of the line and not proceed to the other end until the initial area is brought up to a temperature between 1,000 F and 1,100 F. The torch operator shall have 1,000 F, 1,100 F, & 1,150 F temperature indicating crayons. The steel surface temperature shall be monitored frequently during the heating process, and the temperature shall be controlled so as to achieve 1,100 F.
8. After application of the heating patterns the member being cambered and/or corrected shall stay in the vertical position until the heated areas cool to below 200F, to check and record results.
9. The heated areas shall be allowed to cool to below 600F in ambient conditions. After which time, the areas may be cooled in an accelerated manner using dry, compressed air.

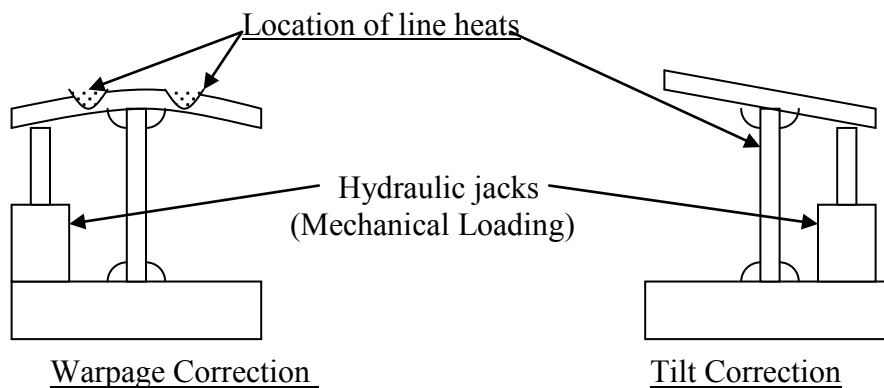
Title: Flange Tilt and Flange Straightness heat correction procedure for 50 ksi and 70 ksi yield strength steels

Revision: 0

The QA representative shall be notified prior to using this procedure.

SCOPE: This procedure is to be used to correct unacceptable amounts of warpage, (deviation from flatness) or flange tilt, (deviation of flanges from a line normal to the centerline of the web) in fabricated girders or rolled beams. Correction shall be achieved through the use of line heating on the girder web, or flanges, or both, in combination with the use of moderate mechanical loading. The QA representative shall be notified prior to beginning any heating operation.

1. The area to be heated shall be determined by the correction required, see sketch below. Warpage shall be corrected through the use of line heats on the flanges. Flange tilt shall be corrected through the use of line heats on the appropriate surface of the web.



2. Heating shall be performed using appropriate sized rosebud style heating torches. Heating shall be confined to areas described in step 3 and shall be performed so as to bring the steel in those areas to a temperature between 1,000 F and 1,100 F as rapidly as possible without overheating the steel.
3. Heating patterns shall be marked on the steel prior to heating. Line heats shall be marked so as to avoid the areas of high restraint directly opposite fillet welds. The line heat length shall be determined by the amount of flange tilt or flange warpage requiring correction.
4. Heating shall begin at one end of the line and not proceed to the other end until the initial area is brought up to a temperature between 1,000 F and 1,100 F. The torch operator shall have 1,000 F, 1,100 F, & 1,150 F temperature indicating crayons. The steel surface temperature shall be monitored frequently during the heating process, and the temperature shall be controlled so as to achieve 1,100 F.
5. Moderate mechanical loading may be used to aid in the correction prior to heating. The force applied shall be a minimum to maintain and support position during the heating process. Mechanical loading shall be achieved using hydraulic jacks in the locations shown for the two types of correction being performed.

Title: Heat correction procedure of flanges not yet assembled to girder webs

Revision: 0

The QA representative shall be notified prior to using this procedure.

1. Support flanges in vertical position, at flange ends and at intermediate points as necessary to produce the required amount of sweep and/or to correct for straightness, per the approved shop drawings and specifications.
2. Intermediate safety catch blocks shall be maintained at mid distance between supports of the member and not more than 2" below the flanges at all times.
3. Heating shall be performed using appropriate sized rosebud style heating torches. Heating shall be confined to areas described in Step 4 and shall be performed so as to bring the steel in these areas to a temperature between 1,000 F and 1,100 F as rapidly as possible without overheating the steel.
4. Two methods for heat correcting Flanges prior to assembly to girder webs may be used, the V-heat method or the Line strip heat method.
5. V-heat Method:
 - a. Heating patterns shall be marked on the flanges prior to heating. Heat patterns will be located at even distances in a quantity sufficient to produce the desired curvature or sweep correction. Patterns shall be truncated triangles with the base of the triangle being that flange edge which shall be concave in the finished girder. The apex of the triangle shall be located on the flange at a point not less than 2" from the edge of the flange. The total included angle of the triangle shall not exceed 20 degrees and the base of the triangle shall not exceed 10". Heat locations shall be determined by the supervisor or the leadman, and shall be approved by QC.
 - b. Heating shall begin at the apex of the triangle and not proceed toward the base until the truncated area is brought up to a temperature between 1,000 F and 1,100 F. Once heating begins to progress towards the base of the triangle it shall not return to the apex. The torch operator shall have 1,000 F, 1,100 F, and 1,150 F temperature indicating crayons. The steel surface temperature shall be monitored frequently during the heating process, and the temperature shall be controlled so as to achieve 1,100 F.
6. Line Heat method:
 - a. Heating patterns shall be marked on the steel prior to heating. Line heats shall be marked along the centerline of flange. The flange will move in the opposite direction of the flange being heated. The line heat lengths and locations shall be determined by the amount of initial correction that is needed, and in which location the correction occurs. The Production supervisor and/or leadman is to determine the locations of the strip heats, and shall be approved by QC prior to heating.
 - b. Heating shall begin at one end of the line and not proceed to the other end until the initial area is brought up to a temperature between 1,000 F and 1,100 F. The torch operator shall have 1,000 F, 1,100 F, & 1,150 F temperature indicating crayons. The steel surface temperature shall be monitored

Title: Heat correction procedure of flanges not yet assembled to girder webs

Contract: Moses Wheeler, Connecticut DOT **Revision:** 0

frequently during the heating process, and the temperature shall be controlled so as to achieve 1,100 F.

7. After application of heating patterns the member being corrected shall stay in position until the heated areas cool to below 200 F.
8. The heated areas shall be allowed to cool to below 600 F in ambient conditions. After which time, the areas may be cooled in an accelerated manner using dry, compressed air.
9. Weight may be applied at the center point, as an external force to aid in achieving the desired results. The added weight will be that which will not exceed the allowable design stress.

Title: Magnetic Particle Lot Testing Procedure of Cross Frames for Curved Structures

Revision: 0

General

This procedure is for the purpose of performing Lot Magnetic Particle testing on cross frames, diaphragms, or lateral braces for curved structures.

Definition of “LOT”

1. According to Section 6 of the AWS Bridge Welding Code, a “LOT” is defined as those tension or compression joints (or both) which were welded in conformance with the same approved WPS and tested with NDT as a group.
2. Structal Bridge will go an additional step, and add in the verbiage that a “LOT” will be as defined in #1 above, with the additional requirement of adding the person performing the welds as well.
3. For the use of this procedure, a “LOT” shall be defined as those tension or compression joints (or both) occurring on a cross frame, diaphragm, or lateral brace for a curved structure or curved section of a structure, which were welded in conformance with the same approved WPS, the same qualified Welder / Welding Operator, and tested with Magnetic Particle Testing as a group. Five (5) members shall be defined as One (1) “LOT”.

Lot Testing Procedure

1. Separate each five (5) cross frames, diaphragms, or lateral braces that were welded with the same WPS and same Operator into their “LOT”. Assign a number to this “LOT” for reporting purposes. Include the WPS number and Welder ID in the “LOT” number.
2. Take Two (2) members from one (1) “LOT” and set up for MT testing on benches. This will represent thirty percent (40%) of each “LOT”
3. MT test 100% of all welds on the two (2) members.
4. If all three members which were MT tested in Step 3 above are acceptable to the AWS D1.5 Bridge Welding code, and contract specifications regarding weld quality, then the “LOT” is deemed acceptable.
5. If any one (1) of the two (2) members selected in step 2 above is unacceptable, then two (2) more members shall be selected for MT testing, which would represent sixty percent (80%) of the “LOT”
 - a. If these additional two (2) members are acceptable for weld quality, then the “LOT” is deemed acceptable.
6. If any one (1) of the two (2) members selected in step #5 is unacceptable, then all five (5) members of the original “LOT” shall be tested, which will represent one hundred percent (100%) of the “LOT”.
7. The QA representative shall be informed of the progress of the testing.



STRUCTAL

Building Better Bridges

386 River Road, Claremont, NH, 03743

Title: Repair Procedure, Gouges in cut edges that are 10 mm (3/8"), or less

Revision: 0

GENERAL

This procedure is to be used for the repair of gouges in cut edges that are 10 mm (3/8") deep or less. Structal Quality Control and the QA representative shall be notified prior to the beginning of the repair.

PROCEDURE

1. If the defective area is to be prepped for repair using air-carbon arc, preheat work area to 65°C (150°F) minimum prior to use of the air-carbon arc.
2. Excavations shall be made with a minimum 6mm (1/4 inch) radius at the bottom of the excavation. The sides shall slope back a minimum 20-degree included angle and the ends shall slope back at 45 degrees.
3. Grind the surface of the excavation to remove carbon pick-up and irregularities.
4. Perform magnetic particle inspection in accordance with Section 6 of the D1.5 Bridge Welding Code on the excavation to insure that no laminations or lamellar tearing exist.
5. Attach run-off tabs as necessary to ensure for complete weld metal to base metal fusion on the material edges. Run-off tabs shall be tack-welded in the repair area, not onto the adjacent base metal.
6. Preheat the work area to the approved WPS being used. Preheat and interpass temperature shall be maintained without interruption until the repair is complete.
7. Weld the excavation using a project approved WPS.
8. Grind the repaired area flush and smooth with the adjacent base metal.
9. Use the Magnetic Particle Testing method for testing the repaired gouges.
10. All nondestructive testing shall be done in accordance with the requirements of the D1.5 Bridge Welding Code.



386 River Road
Claremont, NH, 03743

PROCEDURE FOR RADIOGRAPHIC TESTING OF WELDED SLABS

GENERAL

This procedure will be used for the control of Radiographic Testing of Butt-Welded Flange Plate “Slabs” before stripping down to individual Flange piece marks. All of the following information below will be performed after the Welds have been visually inspected and accepted as well as ground flush.

OUTLINE

- Step 1: Review the shop drawings to ensure correct Flange width.
- Step 2: Multiply the flange width dimension by how many flanges will be cut out of the Slab and record this dimension.
- Step 3: Measure the plate’s full width to determine how much excess plate there is.
- Step 4: Take the excess dimension and divide it by how many flanges are to be stripped out of the plate and record this dimension.
- Step 5: Take the dimension retrieved from step 4, and use it as the starting dimension from the edge of the plate to the first mark. This is the beginning edge of the first Flange to be stripped.
- Step 6: Punch this mark with a Low Stress Die Punch.
- Step 7: From this mark, add the Flange dimension retrieved from step 1, and make a mark. This is the Ending edge of the first Flange to be stripped.
- Step 8: Punch this mark with a Low Stress Die Punch.
- Step 9: From this mark, add 3/16 of an inch for the torch Kerf dimension and make a mark. This is the first edge of the second Flange to be stripped.
- Step 10: Punch this mark with a Low Stress Die Punch.

Follow steps 7 thru 10 until all Flanges have been marked out on the Slab. The Die Punch Marks will be used to ensure the correct alignment of the torches from the CNC controlled Burning Machine.

RADIOGRAPHIC ACCEPT/REJECT CRITERIA

All RT accept/reject criteria will be evaluated to the current AWS D1.5 requirements and to all applicable contract requirements, plus the following addition: The linear distance from a discontinuity to the edge of the designated Flange shall be 3/4 of one inch minimum, anything under 3/4 of an inch shall be rejected.

Title: Heat sweep correction procedure for welded girders with 50 ksi or 70 ksi yield strength steel. Procedure for the initial sweep of rolled beams.

Revision: 0

Notify the QA representative prior to using this procedure.

1. Support the girder / rolled beam, with web in the horizontal position, at girder ends and at intermediate points as necessary to produce the required horizontal curvature (sweep) per the approved shop drawings, within the limitations of the specifications.
2. Intermediate safety catch blocks shall be maintained at mid distance between supports of the member and not more than 2" below the flanges at all times.
3. Heating shall be performed using a properly sized rosebud style heating tip. Heating shall be confined to areas described in Step 5 or Step 6 and shall be performed so as to bring the steel in these areas to a temperature not exceeding 1,100F as rapidly as possible without overheating the steel.
4. Two methods may be used for heat sweeping, or sweep corrections using heat. The V-heat method using truncated triangles or the line strip heat method.
5. V-heat method:
 - a. Heating patterns shall be marked on the girders prior to heating. Heat patterns will be located at even distances in a quantity sufficient to produce the desired camber. Patterns shall be truncated triangles with the base of the triangle being at the flange, the base shall not exceed 10 inches. The apex of the triangle shall be located in the web at a point not less than 75% of the depth of the beam from the base of the triangle. The total included angle of the triangle shall not exceed 20 degrees. The Production supervisor and/or leadman is to determine the locations of the strip heats, and shall be approved by QC prior to heating.
 - b.
 - c. Heating shall begin at the apex of the triangle and not proceed toward the base until the truncated area is brought up to a temperature not exceeding 1,100F. Once heating begins to progress towards the base of the triangle it shall not return to the apex. The torch operator shall have 1,000 F, 1,100 F, and 1,150 F temperature indicating crayons. The steel surface temperature shall be monitored frequently during the heating process.
6. Line Strip heat method:
 - a. Heating patterns shall be marked on the steel prior to heating. Line heats shall be marked along the centerline of web, on the surface of the flange which is to be heated. The beam and/or girder will move in the opposite direction of the flange being heated. The line heat lengths and locations shall be determined by the amount of initial camber that is needed, or the amount of camber correction needed, and in which location the correction occurs. The Production supervisor and/or leadman is to determine the locations of the strip heats, and shall be approved by QC prior to heating.
 - b. Heating shall begin at one end of the line and not proceed to the other end until the initial area is brought up to a temperature between 1,000 F and

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1,100 F. The torch operator shall have 1,000 F, 1,100 F, & 1,150 F temperature indicating crayons. The steel surface temperature shall be monitored frequently during the heating process, and the temperature shall be controlled so as to achieve 1,100 F.

7. After application of the heating patterns the member being cambered and/or corrected shall stay in the vertical position until the heated areas cool to below 200F, to check and record results.
8. The heated areas shall be allowed to cool to below 600F in ambient conditions. After which time, the areas may be cooled in an accelerated manner using dry, compressed air.